

Serial No.: 10/605,598  
Confirmation No.: 2597  
Applicant: HULTÉN, Johan *et al.*  
Atty. Ref.: 00173.0043.PCUS00

**REMARKS:**

**REMARKS REGARDING CLAIMS AMENDMENTS:**

Claims 3 and 4 have been cancelled, and claims 1, 2, and 5 - 12 have been amended to correct spelling errors and remove recitation of "the" before "said" from several of these claims. By further amendment, Claim 2 now includes limitations from claims 3 and 4 to overcome problems associated with claims 5 - 8 that were multiple dependent claims having dependence from multiple dependent claims. Claims 1, 2 and 5 - 12 are pending in the present application.

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**IN RESPONSE TO THE OFFICE ACTION:**

Applicants have no basis for comment regarding Point 1. (Search Report - Forum 210 and examiner-obtained form 409) of the Office Action since the Examiner has not been explicit with regard to the disagreement.

As indicated above, claims amendment has effected deletion of "the" before "said" in affected claims 1, 2, 5 and 8 - 12.

The summary table differentiates claims of the present invention from the references.

**Comparison of the present invention with teachings of the reference (Suzuki)**

Claims Requirements of the Present Invention (Published Application U.S. 2004/0129509 A1)	US 5,568,846 (Dagh et al.) US 5,855,416 (Tasker et al.) WO 99/19525 (Cooper) DE 019507102A1 (Kappich) DE 004133593A1 (Wirth)
Claim 1 and Claim 9 each recite "ratio B/R between the <u>radial extent B</u> of the lining and the radius R of the rotor is <u>less than 0.38</u> ."	None of the references teach either "radial extent," as defined for the present invention in paragraph [0010], or the ratio B/R that has an effect on the characteristics of wear bands appearing on brake discs due to braking torque.

The present invention introduces the specific measure of "radial extent" and dependence of brake disc fatigue on B/R. Since the cited references fail, either alone or in combination, to teach or suggest these limitations of the claimed subject matter, they do not meet requirements for rejection of an invention for obviousness, i.e. the teaching or suggestion of all the limitations of the claims (MPEP §706.02(j)). Detailed information will be presented to show that the references fail to meet necessary criteria for rejection of the present invention under 35 U.S.C. § 103(a). Applicants, therefore, request that the Examiner reconsider and withdraw the rejection.

**REJECTION UNDER 35 U.S.C. § 103(a):**

The Office Action indicates rejection of claims as follows: Claims 1 - 12 are rejected under 35 U.S.C. §103(a) as being unpatentable over Dagh et al. (5568846) in view of Tasker et al. (5855416) further in view of Cooper et al. (WO 99/19525) and Wirth (DE 4133593) or Kappich (DE 19507102) and the two Math Forum articles.

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Summary of the References: United States Patent (US 5,568,846) to Dagh et al. includes an inventor in common with the present application and shows a brake disk mounting relevant to the present invention. The reference addresses the need for a disk that provides a “non-circular cross-section region with closely spaced V-shaped ridges and troughs, (such that) the level of the radial fracture stresses on the disc as well as the shear and bending stresses on the shaped region can be maintained at an acceptable level, at the same time that the risk of jamming is eliminated even with the very high braking forces which can arise in the heaviest vehicle class” (Column 2, lines 3 - 10).

US 5,855,416 (Tasker) teaches “a *reinforced vehicle axle housing* (emphasis added) assembly for rear disc brake adaptation on a heavy duty vehicle” (Column 1, lines 34 - 36), but does not suggest change in brake pad “radial extent” or width to minimize band-shaped wear of disk brakes. See also Column 1, line 57 to Column 2, line 4 of the reference.

WO 99/19525 (Cooper) teaches disc brake performance based on the composition not the design of the disk rotor.

DE 4133593 (Wirth) refers to a problem with uneven wear of the disc surface and discusses a method of designing the azimuthal extension, affecting the length, of the brake linings in order to overcome uneven wear. Uneven wear and band-shaped wear are different types of wear produced by very different type of physical phenomena. Uneven wear occurs over extended periods of time due to variations in brake pad pressure, composition, and relative velocity differences. Band-shaped wear is a short term phenomenon resulting from local heating, which can be mitigated according to the present invention, using brake pad design determined using the ratio B/R.

DE 19507102 Kappich teaches reduction of screeching or squealing of disc brakes by brake pad length adjustment.

Application of “The Math Forum @ Drexel” is confusing as a basis for rejection of the present invention. The mathematics of circular measurement has no bearing on the interaction between brake disks and brake pads, which could be made to function using non-circular geometry.

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Discussion of the Present Application: According to MPEP Section 706.02(j), a proper rejection of claims under 35 USC §103 should contain points A - D, discussed as follows:

(A) the relevant teachings of the prior art relied upon, preferably with reference to the relevant column or page number(s) and line number(s) where appropriate:

Application of this requirement appears to be missing from the Office Action considering the statement, reproduced for convenient reference below, which provides a sentence describing the present invention then rejects the invention using cited references without showing their relevance to claims individually.

The claims are directed to, *inter alia*, essentially the ratio between the radius of a brake rotor and the radial extent or length of a braking lining for a disk brake.

It would have been obvious to modify the disk brake of Dagb et al. to be used with heavy vehicles having an axle pressure between 6 and 14 tons, or whatever, desired as taught by Tasker et al. at column 5, line 60 to column 6, line 7 in that the particular load or pressure at the axles is typical for a heavy truck and is based upon the load that the artisan intends to carry. As to the material of the disk brake rotor being "cast iron alloy," it would have been obvious to one having ordinary skill in the art at the time the invention was made to select the material as per Cooper since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re. Leshin, 125 USPQ 416.

The Office Action interprets the "radial extent" to refer to the "length of a brake lining." However, the present invention clearly shows that radial extent refers to the width of the brake lining (see paragraphs [0010] and [0011] of published application U.S. 2004/0129509 A1).

Claims 1, 2 and 9 - 12 according to the present invention include a radial extent or width limitation, but are silent regarding weld-reinforcement of a rear axle housing taught by the only specified portion of any reference (Tasker, column 5, line 60 to column 6, line 7).

None of the claims of the present invention recite compositional information taught by the reference of Cooper (WO 99/19525). In this case, material selection is a moot point.

(B) the difference or differences in the claim over the applied reference(s):

The Office Action does not appear to address this requirement.

(C) the proposed modification of the applied reference(s) necessary to arrive at the claimed subject matter:

The Office Action contained no suggestions for modifying teachings of the references to arrived at subject matter recited in claims of the present invention.

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and (D) an explanation why one of ordinary skill in the art at the time the invention was made would have been motivated to make the proposed modification:

The reference of Dagb et al. teaches the design of a brake disk; the reference of Tasker et al. teaches a reinforced housing; the reference of Cooper teaches disk brake materials, the reference of Wirth teaches that brake disk wear is the result of several influences including relative lining width, lining shape, rigidity of the brake lining retainer, rigidity of the brake lining etc., then uses length modification as a solution to wear; Kappich solves the problem of squealing brakes by brake pad length adjustment. Wirth appears to mention brake lining width but does not teach its application to problems with disk brakes. All other references are silent regarding the brake lining width or "radial extent" requirement of claims of the present invention. The diversity of teachings of the applied references does not guide or provide motivation for one skilled in the art to discover a disk brake having a radial extent or B/R ratio as claimed by the present invention.

As indicated, the present Office Action does not relate cited references to claimed subject matter of the present invention as presented by limitations of individual claims and thereby fails to fully satisfy requirements (A - D).

The Office Action includes the following statement:

Re the particular recognition by applicant that correlating the ratio between the brake lining or length and the radius of the brake rotor is significant, each one of the references to Wirth and Kappich recognizes the relationship and its significance. See MPEP 2144.05 under the heading, "Only Result-Effective Variables Can Be Optimized." It appears that the ratio is a result-effective variable which when optimized achieves a desired result of at least reduced vibration or resonance.

As presented the statement suggests an error of appreciation of teachings according to the present invention. Recitation of "radial extent" in claims of the present application refers to the width, not the length of a brake lining. Further, the present invention addresses the need to reduce "band-shaped wear" and cracking of brake disks. Nowhere is mention made to "reduced vibration and resonance" as a problem according to the present invention. Incorrect identification of a response, e.g. vibration rather than band-shaped wear, prevents the correct selection of a result-effective variable, e.g. "radial extent." Unless the references identify the correct result-effective variable it will be unlikely that one skilled in the art can perform optimization for improved response.

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The statement concerning "evidence that claimed selections are critical" is unclear because amended Claim 2 provides relationships between braking torque and radial extent necessary to reduce cracking and band shaped wear of brake disks. Mathematics of circular measure does not appear to apply to assemblies affected by brake power, braking torque, and dimensional relationships of brake pad width and brake disk radius (B/R).

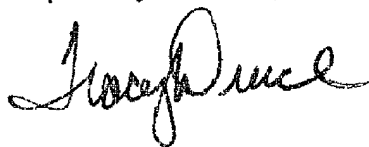
Applicants have made an earnest attempt to respond to all the points included in the Office Action and, in view of the above, submit that the requirement and burden of presenting of a *prima facie* case of obviousness under 35 USC §103 have not been fulfilled. Amendment of claims places the application in condition for allowance. Consequently, request is respectfully made for reconsideration of the application and notification of allowance of claims 1, 2 and 5 - 12 in the next paper from the Office.

The undersigned representative requests any extension of time that may be deemed necessary to further the prosecution of this application.

The undersigned representative authorizes the Commissioner to charge any additional fees under 37 C.F.R. 1.16 or 1.17 that may be required, or credit any overpayment, to Deposit Account No. 14-1437, referencing Order No. 00173.0043.PCUS00.

In order to facilitate the resolution of any issues or questions presented by this paper, the Examiner should directly contact the undersigned by phone to further the discussion.

Respectfully submitted,



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